ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

SUBSURFACE INVESTIGATION

STATE JOB NO. 080444

FEDERAL AID PROJECT NO. NHPP-0036(17)

HAW CREEK STR. & APPRS. (S)

STATE HIGHWAY 123 SECTION 3

IN JOHNSON COUNTY

LETTING OF SEPTEMBER 21, 2016

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

December 3, 2012

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 080444
Haw Creek Str. & Apprs. (S)
Route 123 Section 3
Johnson County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of replacing the existing bridge crossing Haw Creek on Highway 123. Samples were taken in the existing travel lanes, and ditch line of Highway 123.

Based on laboratory results of samples obtained, the subgrade soils consist of sandy clay containing varying amounts of sandstone and shale fragments. The proposed grade line closely matches that of the existing roadway. The subgrade soils are expected to provide a stable working platform with normal drying and compactive efforts if the weather is favorable during construction.

For design and right of way purposes, the maximum embankment height is anticipated to be no more than 10 feet. The embankment may be constructed with locally available material utilizing a 3:1 slope configuration. When cross-sections become available, the Geotechnical section will make further embankment recommendations.

Listed below is the additional information requested for use in developing the plans:

1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers located in the vicinity of Clarksville.

2. Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.4	94.6
Binder Course	4.5	95.5
Base Course	4.2	95.8

Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment
cc: State Constr. Eng. – Master File Copy
District 8 Engineer
Planning Div.
G. C. File

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY STRENGTH TEST REPORT ***

DATE - 11/29/2012
JOB NUMBER - 080444

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 36
DISTRICT NO. - 08

JOB NAME - HAW CREEK STR.& APPRS. (S)

STATION LIMITS	R-VALUE AT 240 psi
BEGIN JOB - END JOB	8
RESILIENT MODULUS	
STA.111+00	7046

REMARKS -
-

AASHTO TESTS : T190

JOB: **080444**

JOB NAME: **HAW CREEK STR.& APPRS. (S)**

COUNTY NO. **34** DATE TESTED **11/26/2012**

Arkansas State Highway Transporation Department

Materials Division

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	LAB #:	%MOISTURE
				S	I	E	V	E S					
111+00	25'RT	0-5	BROWN	85	79	72	50	35	19	5	A-2-4 (0)	RV1232	
111+00	7'RT	0-5	BR/GR	75	54	41	34	28	28	12	A-2-6(0)	S1228	9.4
111+00	25'RT	0-5	BROWN	92	82	74	53	39	21	9	A-4 (0)	S1229	16
119+00	7'LT	0-5	BR/GR	97	88	73	57	52	32	16	A-6 (5)	S1230	14.3
119+00	25'LT	0-5	BROWN	90	88	84	72	64	28	12	A-6 (2)	S1231	24.3

comments:

Wednesday, November 28, 2012

JOB: 080444

JOB NAME: HAW CREEK STR.& APPRS. (S)

COUNTY NO. 34

Arkansas State Highway Transporation Department

Materials Division

Michael Benson, Materials Engineer

DATE TESTED

11/26/2012

PAVEMENT SOUNDINGS

STA.#	LOC.		
111+00	7'RT	ACHMSC	AGG BASE CRS CL 7
		3.0	5.0
111+00	25'RT	ACHMSC	AGG BASE CRS CL 7
		---	---
119+00	7'LT	ACHMSC	AGG BASE CRS CL 7
		2.5	6.0

comments:

Wednesday, November 28, 2012

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES

Job No.	080444	**Material Code**	SSRVPS
Date Sampled:	11/26/12	**Station No.:**	111+00
Date Tested:	November 27, 2012	**Location:**	25'RT.
Name of Project:	HAW CREEK STR. & APPRS. (S)		
County:	**Code:** 36 **Name:** JOHNSON		
Sampled By:	FAULKNER	**Depth:**	0-5
Lab No.:	20124442	**AASHTO Class:**	A-2-4(0)
Sample ID:	RV1232	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

1. Testing Information:

Preconditioning - Permanent Strain > 5% (Y=Yes or N= No)	N
Testing - Permanent Strain > 5% (Y=Yes or N=No)	N
Number of Load Sequences Completed (0-15)	15

2. Specimen Information:

Specimen Diameter (in):	
Top	3.99
Middle	4.00
Bottom	4.00
Average	4.00
Membrane Thickness (in):	0.00
Height of Specimen, Cap and Base (in):	8.02
Height of Cap and Base (in):	0.00
Initial Length, Lo (in):	8.02
Initial Area, Ao (sq. in):	12.55
Initial Volume, AoLo (cu. in):	100.61

3. Soil Specimen Weight:

Weight of Wet Soil Used (g):	3435.90

4. Soil Properties:

Optimum Moisture Content (%):	12.5
Maximum Dry Density (pcf):	119
95% of MDD (pcf):	113.1
In-Situ Moisture Content (%):	N/A

5. Specimen Properties:

Wet Weight (g):	3435.90
Compaction Moisture content (%):	12.3
Compaction Wet Density (pcf):	130.12
Compaction Dry Density (pcf):	115.87
Moisture Content After Mr Test (%):	12.2

6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable): #VALUE!

7. Resilient Modulus, Mr: 8785(Sc)^-0.27320(S3)^0.46509

8. Comments

9. Tested By: RC/AD/DT **Date:** November 27, 2012

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES

Job No.	080444	**Material Code**	SSRVPS
Date Sampled:	11/26/12	**Station No.:**	111+00
Date Tested:	November 27, 2012	**Location:**	25'RT.
Name of Project:	HAW CREEK STR. & APPRS. (S)		
County:	**Code:** 36 **Name:** JOHNSON		
Sampled By:	FAULKNER	**Depth:**	0-5
Lab No.:	20124442	**AASHTO Class:**	A-2-4(0)
Sample ID:	RV1232	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

PARAMETER	*Chamber Confining Pressure*	*Nominal Maximum Axial Stress*	*Actual Applied Max. Axial Load*	*Actual Applied Cyclic Load*	*Actual Applied Contact Load*	*Actual Applied Max. Axial Stress*	*Actual Applied Cyclic Stress*	*Actual Applied Contact Stress*	*Average Recov Def LVDT 1 and 2*	*Resilient Strain*	*Resilient Modulus*
DESIGNATION	S_3	S_{cyclic}	P_{max}	P_{cyclic}	$P_{contact}$	S_{max}	S_{cyclic}	$S_{contact}$	H_{avg}	ε_r	M_r
UNIT	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in/in	psi
Sequence 1	6.0	2.0	25.7	23.1	2.6	2.0	1.8	0.2	0.00089	0.00011	16,603
Sequence 2	6.0	4.0	48.3	45.7	2.7	3.9	3.6	0.2	0.00191	0.00024	15,322
Sequence 3	6.0	6.0	71.3	67.6	3.8	5.7	5.4	0.3	0.00316	0.00039	13,663
Sequence 4	6.0	8.0	95.0	88.7	6.4	7.6	7.1	0.5	0.00473	0.00059	11,983
Sequence 5	6.0	10.0	118.1	109.2	8.9	9.4	8.7	0.7	0.00639	0.00080	10,921
Sequence 6	4.0	2.0	25.4	22.7	2.7	2.0	1.8	0.2	0.00106	0.00013	13,681
Sequence 7	4.0	4.0	47.2	44.4	2.7	3.8	3.5	0.2	0.00243	0.00030	11,668
Sequence 8	4.0	6.0	68.4	65.5	2.9	5.4	5.2	0.2	0.00407	0.00051	10,281
Sequence 9	4.0	8.0	91.9	86.5	5.4	7.3	6.9	0.4	0.00582	0.00073	9,502
Sequence 10	4.0	10.0	115.2	107.1	8.1	9.2	8.5	0.6	0.00758	0.00094	9,039
Sequence 11	2.0	2.0	25.1	22.3	2.8	2.0	1.8	0.2	0.00134	0.00017	10,677
Sequence 12	2.0	4.0	45.8	42.9	2.8	3.6	3.4	0.2	0.00315	0.00039	8,728
Sequence 13	2.0	6.0	65.6	62.7	2.9	5.2	5.0	0.2	0.00521	0.00065	7,698
Sequence 14	2.0	8.0	87.5	82.9	4.7	7.0	6.6	0.4	0.00729	0.00091	7,263
Sequence 15	2.0	10.0	110.7	103.4	7.2	8.8	8.2	0.6	0.00938	0.00117	7,046

TESTED BY RC/AD/DT DATE November 27, 2012

REVIEWED BY _____ DATE _____

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

MATERIALS DIVISION

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS

RECOMPACTED / THINWALL TUBE SAMPLES

Job No.	080444	**Material Code**	SSRVPS
Date Sampled:	11/26/12	**Station No.:**	111+00
Date Tested:	November 27, 2012	**Location:**	25'RT.
Name of Project:	HAW CREEK STR. & APPRS. (S)		
County:	**Code:** 36 **Name:** JOHNSON		
Sampled By:	FAULKNER	**Depth:**	0-5
Lab No.:	20124442	**AASHTO Class:**	A-2-4(0)
Sample ID:	RV1232	**Material Type (1 or 2):**	2
LATITUDE:		**LONGITUDE:**	

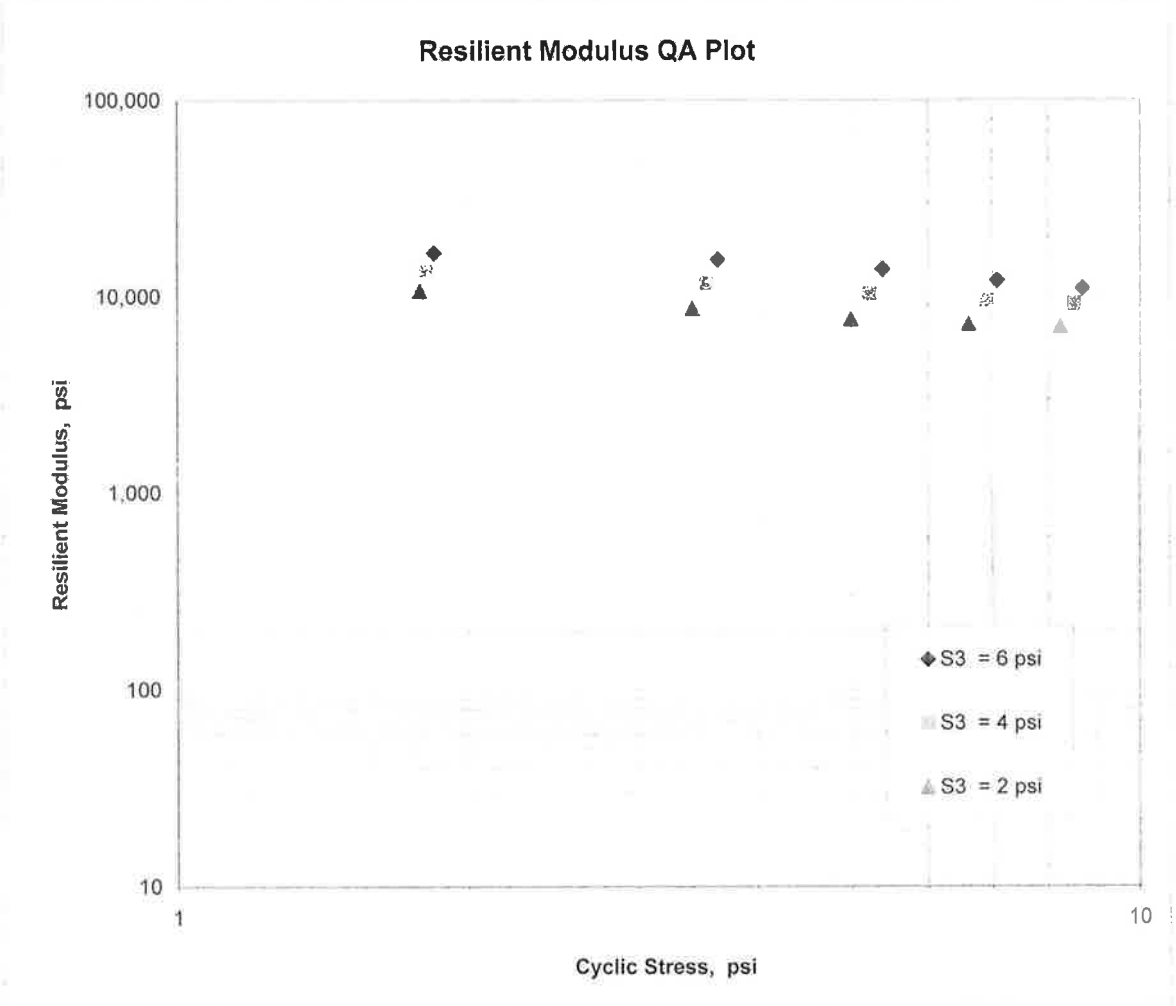
$$M_R = K1\ (S_C)^{K2}\ (S_3)^{K5}$$

K1 = 8,785

K2 = -0.27320

K5 = 0.46509

R^2 = 0.98



ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 11/26/12
JOB NUMBER - 080444
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - HAW CREEK STR.& APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - JOHNSON COUNTY
SAMPLED BY - FAULKNER
SAMPLE FROM - TESTHOLE
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 36
DISTRICT NO. - 08

DATE SAMPLED - 11/15/12
DATE RECEIVED - 11/16/12
DATE TESTED - 11/26/12

LAB NUMBER	20124438	20124439	20124440
SAMPLE ID	S1228	S1229	S1230
TEST STATUS	INFORMATION ONLY	INFORMATION ONLY	INFORMATION ONLY
STATION	111+00	111+00	119+00
LOCATION	7'RT	25'RT	7'LT
DEPTH IN FEET	0-5	0-5	0-5
MAT'L COLOR	BR/GR	BROWN	BR/GR
MAT'L TYPE			
LATITUDE DEG-MIN-SEC	35 40 54.40	35 40 54.30	35 40 50.60
LONGITUDE DEG-MIN-SEC	93 14 49.40	93 14 49.40	93 14 41.60
% PASSING 2 IN.			
1 1/2 IN.		100	
3/4 IN.	100	98	
3/8 IN.	90	94	100
NO. 4	75	92	97
NO. 10	54	82	88
NO. 40	41	74	73
NO. 80	34	53	57
NO. 200	28	39	52
LIQUID LIMIT	28	21	32
PLASTICITY INDEX	12	9	16
AASHTO SOIL	A-2-6(0)	A-4 (0)	A-6 (5)
UNIFIED SOIL			
% MOISTURE CONTENT	9.4	16.0	14.3
ACHMSC (IN)	3.0	---	2.5
AGG BASE CRS CL 7 (IN)	5.0	---	6.0

REMARKS -

AASHTO TESTS : T24 T88 T89 T90 T265

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE	- 11/26/12	SEQUENCE NO.	- 2
JOB NUMBER	- 080444	MATERIAL CODE	- SSRVPS
FEDERAL AID NO.	- TO BE ASSIGNED	SPEC. YEAR	- 2003
PURPOSE	- SOIL SURVEY SAMPLE	SUPPLIER ID.	- 1
SPEC. REMARKS	- NO SPECIFICATION CHECK	COUNTY/STATE	- 36
SUPPLIER NAME	- STATE	DISTRICT NO.	- 08
NAME OF PROJECT	- HAW CREEK STR.& APPRS. (S)		
PROJECT ENGINEER	- NOT APPLICABLE		
PIT/QUARRY	- ARKANSAS		
LOCATION	- JOHNSON COUNTY	DATE SAMPLED	- 11/15/12
SAMPLED BY	- FAULKNER	DATE RECEIVED	- 11/16/12
SAMPLE FROM	- TESTHOLE	DATE TESTED	- 11/26/12

MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER	20124441
SAMPLE ID	S1231
TEST STATUS	INFORMATION ONLY
STATION	119+00
LOCATION	25'LT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	35 40 50.70
LONGITUDE DEG-MIN-SEC	93 14 41.40

% PASSING 2 IN.	
1 1/2 IN.	100
3/4 IN.	96
3/8 IN.	94
NO. 4	90
NO. 10	88
NO. 40	84
NO. 80	72
NO. 200	64

LIQUID LIMIT	28
PLASTICITY INDEX	12
AASHTO SOIL	A-6 (2)
UNIFIED SOIL	
% MOISTURE CONTENT	24.3

REMARKS -

AASHTO TESTS : T24 T88 T89 T90 T265

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT - LITTLE ROCK, ARKANSAS
MATERIALS DIVISION
MICHAEL BENSON, MATERIALS ENGINEER
*** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 11/28/12
JOB NUMBER - 080444
FEDERAL AID NO.- TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - HAW CREEK STR.& APPRS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - JOHNSON COUNTY
SAMPLED BY - FAULKNER
SAMPLE FROM - TESTHOLE
MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

SEQUENCE NO. - 1
MATERIAL CODE - RV
SPEC. YEAR - 2003
SUPPLIER ID. - 1
COUNTY/STATE - 36
DISTRICT NO. - 08

DATE SAMPLED - 11/15/12
DATE RECEIVED - 11/16/12
DATE TESTED - 11/26/12

LAB NUMBER	20124442
SAMPLE ID	RV1232
TEST STATUS	INFORMATION ONLY
STATION	111+00
LOCATION	25'RT
DEPTH IN FEET	0-5
MAT'L COLOR	BROWN
MAT'L TYPE	
LATITUDE DEG-MIN-SEC	35 40 54.30
LONGITUDE DEG-MIN-SEC	93 14 49.40
% PASSING 2 IN.	
1 1/2 IN.	100
3/4 IN.	98
3/8 IN.	92
NO. 4	85
NO. 10	79
NO. 40	72
NO. 80	50
NO. 200	35
LIQUID LIMIT	19
PLASTICITY INDEX	5
AASHTO SOIL	A-2-4 (0)
UNIFIED SOIL	
% MOISTURE CONTENT	

REMARKS -

AASHTO TESTS : T24 T88 T89 T90 T265

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

April 1, 2014

TO: Mr. Carl Fuselier, Bridge Engineer

SUBJECT: Job No. 080444
Haw Creek Str. & Apprs. (S)
Route 123, Section 3
Johnson County

Transmitted herewith are a brief summary of the geology and site conditions, D50 analysis test results, and the logs of the borings conducted for the structures and approaches of the above referenced project. The samples obtained by the Standard Penetration Tests were brought to the laboratory and visually classified by experienced lab personnel to confirm the field identifications. The rock cores are available for inspection at the Materials Division.

TABLE 1 – Bearing Capacity Recommendation

Type of Founding Material	Allowable Bearing Capacity (ksf)
Sand w/ Clay Seams and Cobbles	6
Shale w/ Sandstone Seams	20

If you have any questions concerning these recommendations, please contact the Geotechnical Section

Michael C. Benson
Materials Engineer

MCB:rpt
cc: State Construction Engineer - Master File Copy
District 8 Engineer
G.C. File

GEOLOGY AND SITE CONDITIONS
Job No. 080444

Haw Creek Str. & Apprs. (S)
Johnson County
Route 123 Section 3

Site Conditions

The existing bridge is a three span bridge crossing Haw Creek. The bridge consists of a concrete deck supported by 11 steel beams and rock and mortar spread footings. The guardrail is constructed of steel held up by timber posts on the bridge and steel posts leading up to the bridge. The stream at the point of the bridge flows in an easterly direction with the bridge crossing the channel at an angle. The area surrounding the bridge is moderately to heavily wooded.

Site Geology

The proposed bridge is located on the mapped alluvium and terrace deposits (map symbol Qat) consisting of unconsolidated clay, silt, sand, and gravel. The alluvium and terrace deposits overlie the Cane Hill member of the Hale Formation. The Cane Hill consists of a gray to black fissile clay to silty shale in the lower portion that contains iron nodules and small limonitic box work fragments. The upper portion consists of thin-bedded, ripple-marked, micaceous siltstones and sandstones. The Cane Hill varies from black to dark-gray on fresh surfaces and light-gray and light-orange-brown on weathered surfaces. This unit can form steep slopes but is susceptible to slope failure creating landslides. The Cane Hill member is unconformable with the Pitkin Limestone. The Cane Hill is approximately 160-280 ft. Bedrock was encountered at depths ranging from 9.9 to 16.5 feet below ground level.

Subsurface Conditions

Based on the results of the borings, the subsurface stratigraphy may be generalized as follows:

0 to 9.9 Feet*: Varies from moist to wet, medium dense to very dense, brown **sand with clay seams and gravel (sandstone fragments)** to brown and gray **sandstone cobbles and boulders**.

9.9 to 16.5 Feet**: Varies from wet, medium dense to very dense, brown **sand with clay seams and gravel (sandstone fragments)** to brown and gray **sandstone cobbles and boulders** to medium-bedded, slightly weathered, cemented, gray **calcareous sandstone** to medium hard to hard, slightly weathered, dark gray **shale with sandstone seams**.

16.5 to 20.1 Feet: Varies from medium-bedded, slightly weathered, cemented, gray **calcareous sandstone** to medium hard to hard, slightly weathered, dark gray **shale with sandstone seams**. An approximately 0.6 layer of limestone was encountered in this zone in one boring.

20.1 to 27.4 Feet: Consists of medium hard to hard, slightly weathered, dark gray **shale with sandstone seams**.

* One boring encountered a water stratum 9.0 feet below ground level.

** One boring encountered water loss from 11.4 to 12.0 and at 12.2 feet below ground level.

D_{50} AGGREGATE ANALYSIS FOR SCOUR CALCULATIONS

Job No. 080444

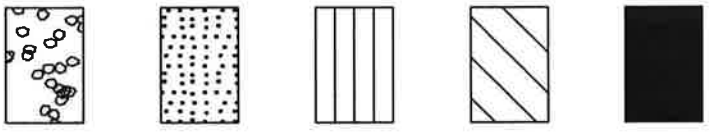
Creek Name	Station	Sample Type	Location	Depth (FT)	Aggregate Size (D50) (IN)
Haw Creek	113+97	Creek Bank	100' Rt. C.L. Construction	NA	0.0555

LEGEND

SOIL TYPES

(SHOWN IN SYMBOL COLUMN)

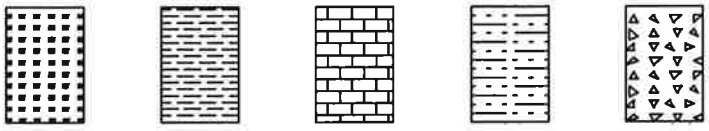
(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL | SAND | SILT | CLAY | ORGANIC MATTER

ROCK TYPES

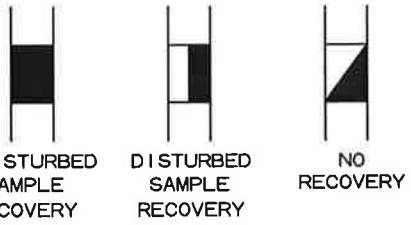
(SHOWN IN SYMBOL COLUMN)



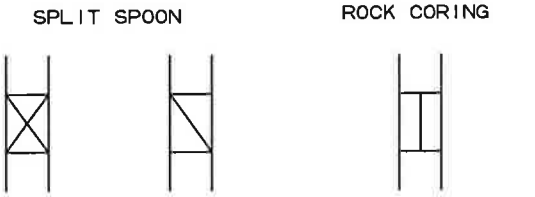
SANDSTONE | SHALE or SILTSTONE | LIMESTONE or DOLOMITE | ALTERNATING LAYERS of SHALE and SANDSTONE | OTHER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)



UNDISTURBED SAMPLE RECOVERY | DISTURBED SAMPLE RECOVERY | NO RECOVERY



SAMPLE RECOVERY | NO RECOVERY | % RECOVERY INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
'N' Value	Density	'N' Value	Consistency	'N' Value	Consistency	'N' Value	Consistency
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5-10	Loose	2-4	Soft	2-4	Soft	31-60	Soft
11-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than 2'	
Over 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		31-60	Hard	31-60	Hard	in 60 Blows:	Medium Hard
		Over 60	Very Hard	Over 60	Very Hard	Less than 2'	
						Penetration	
						in 60 Blows:	Hard

1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
3. Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9=17 blows/ft$. The "N" Value corrected to 60% efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 1
PAGE 1 OF 1

JOB NO. 080444 Johnson County
JOB NAME: Haw Creek Str. & Apprs.
S.H. 123
STATION: 114+82
LOCATION: 17' Right of Center Line of Construction
LOGGED BY: David Allen

DATE: February 25, 2014
TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring
EQUIPMENT: CME 850 w/ CME Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 27.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 746.3	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% SCR	% RQD
5			Moist, Medium Dense, Brown Sand with Clay Seams, Gravel (Sandstone Fragments) and Cobbles						11 12-12 30 (.01')		
			Sandstone Cobbles and Boulders							50	0
10			Brown and Gray Sandstone Cobbles and Boulders with Dark Gray Weathered Shale Layers *							48	0
15										28	18
20			SANDSTONE WITH OCCASIONAL LIMESTONE LAYERS AND DARK GRAY SHALE PARTINGS - Gray, Medium Bedded, Slightly Weathered, Calcareous, Cemented, with Slight Dip							94	44
25			SHALE WITH GRAY CALCAREOUS SANDSTONE SEAMS - Dark Gray, Laminated, Slightly Weathered, Medium Hard to Hard, with Slight Dip							100	84
30			Boring Terminated								
35											

REMARKS: * Partial water loss was encountered from 11.4' to 12.0' and at 12.2'.

ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.

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JOB NO. 080444 Johnson County
JOB NAME: Haw Creek Str. & Apprs.
S.H. 123
STATION: 115+15
LOCATION: 23' Left of Center Line of Construction
LOGGED BY: David Allen

DATE: February 26, 2014
TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring
EQUIPMENT: CME 850 w/ CME Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 23.3

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 746.3	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% SCR	% RQD
			Moist, Dense, Brown Sand with Clay Seams and Gravel (Sandstone Fragments)								
									60 (1")	40	0
5			Brown and Gray Sandstone Cobbles and Boulders							52	0
10										68	34
			SANDSTONE - Gray, Medium Bedded, Slightly Weathered, Calcareous, Cemented, with Slight Dip								
15			SHALE WITH GRAY CALCAREOUS SANDSTONE SEAMS - Dark Gray, Laminated, Slightly Weathered, Medium Hard to Hard, with Slight Dip							84	28
20			SANDSTONE WITH DARK GRAY SHALE PARTINGS - Gray, Medium Bedded, Slightly Weathered, Calcareous, Cemented, with Slight Dip								
			SHALE WITH GRAY CALCAREOUS SANDSTONE SEAMS - Dark Gray, Laminated, Slightly Weathered, Medium Hard to Hard, with Slight Dip							100	76
25			Boring Terminated								
30											
35											

REMARKS:

ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.

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JOB NO. 080444 Johnson County
JOB NAME: Haw Creek Str. & Apprs.
S.H. 123
STATION: 115+97
LOCATION: 15' Right of Center Line of Construction
LOGGED BY: David Allen

DATE: February 25, 2014
TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring
EQUIPMENT: CME 850 w/ CME Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 23.9

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% SCR	% RQD
			SURFACE ELEVATION: 746.3								
5		X	Moist, Medium Dense, Brown Sand with Clay Seams and Gravel (Sandstone Fragments)						14 16-14		
10			SHALE WITH GRAY CALCAREOUS SANDSTONE SEAMS - Dark Gray, Laminated, Slightly Weathered, Medium Hard to Hard, with Slight Dip						60 (2")	92	10
15			SANDSTONE WITH DARK GRAY SHALE PARTINGS - Gray, Medium Bedded, Slightly Weathered, Calcareous, Cemented, with Slight Dip							100	38
20			SHALE WITH GRAY CALCAREOUS SANDSTONE SEAMS - Dark Gray, Laminated, Slightly Weathered, Medium Hard to Hard, with Slight Dip							100	44
25			Boring Terminated								
30											
35											

REMARKS:

ARKANSAS HWY. & TRANS. DEPARTMENT
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 4
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JOB NO. 080444 Johnson County
JOB NAME: Haw Creek Str. & Apprs.
S.H. 123
STATION: 116+09
LOCATION: 10' Left of Center Line of Construction
LOGGED BY: David Allen

DATE: February 25, 2014
TYPE OF DRILLING: Hollow Stem Auger & Diamond Coring
EQUIPMENT: CME 850 w/ CME Automatic Hammer
HAMMER CORRECTION FACTOR: 1.23

COMPLETION DEPTH: 25.1

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 745.7	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% SCR	% RQD
5			Moist, Medium Dense, Brown Sand with Clay Seams and Gravel (Sandstone Fragments)						8 7-11		
10			Moist to Wet, Medium Dense to Dense, Brown Sand with Clay Seams and Gravel (Sandstone and Shale Fragments) *						11 16-17		
15			Wet, Medium Dense, Brown Sand with Clay Seams, Gravel (Sandstone Fragments) and Cobbles						7 12-14 10 12-14 12 60 (2")		
20			Wet, Very Dense, Brown Sand with Clay Seams and Gravel (Sandstone and Shale Fragments) SANDSTONE WITH DARK GRAY SHALE PARTINGS - Gray, Medium Bedded, Slightly Weathered, Calcareous, Cemented, with Slight Dip and Fractured Layers							88	11
25			SHALE WITH GRAY CALCAREOUS SANDSTONE SEAMS - Dark Gray, Laminated, Slightly Weathered, Medium Hard to Hard, with Slight Dip							100	44
30			Boring Terminated							100	24
35											

REMARKS: * A water stratum was encountered at 9.0'.